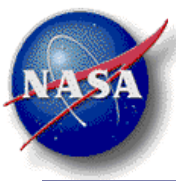


Providing observations and analysis for the Earth System Grid Federation: update and plans

Jerry Potter – NASA GSFC - NCCS

CERES Science Team Meeting
May 9, 2013



G. Potter, L. Carriere, D. Nadeau, M. McInerney

Goddard Space Flight Center

D. Waliser, J. Teixeira, R. Ferraro, D. Crichton, L. Cinquini, others....

Jet Propulsion Laboratory, California Institute of Technology

P. Gleckler, K. Taylor, D. Williams

Lawrence Livermore National Laboratory

T. Lee, J. Kaye, M. Maiden, S. Berrick

NASA HQ

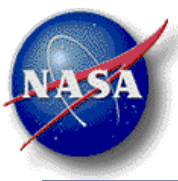
AIRS, AMSR-E, CERES, MLS, MODIS, OSTM, OVW, TRMM, (PO)DAAC, others...

MANY OTHERS

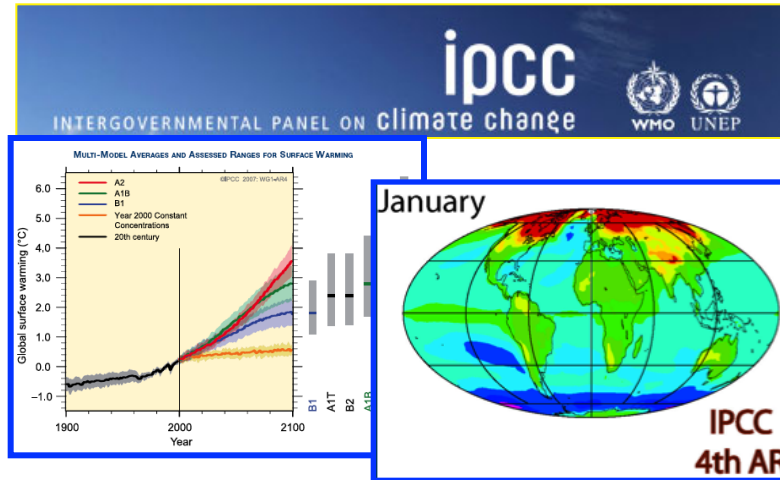
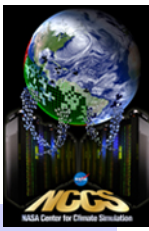
NASA obs4MIPs Science Working Group

D. Waliser/JPL (chair), K. Bowman/JPL, A. da Silva/GSFC, F. Landerer/JPL,
C. Peters-Lidard/GSFC, N. Loeb/LaRC, R. Nemani/ARC, S. Platnick/GSFC,
P. Gleckler (PCMDI), J. Bates (NOAA)

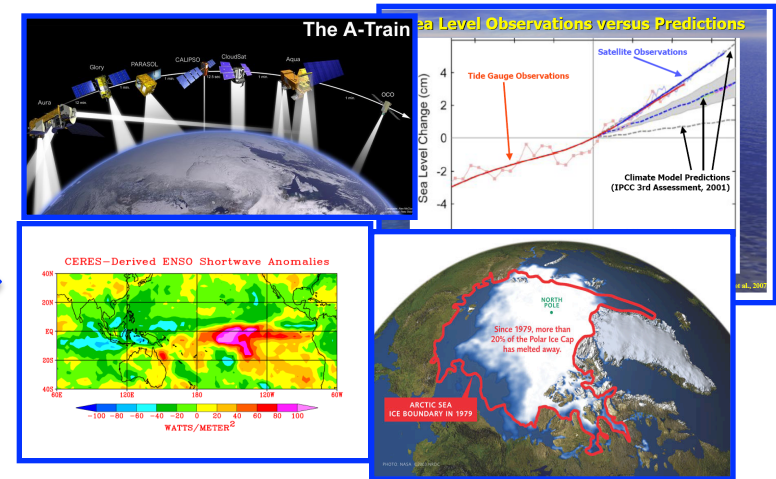
Program Executive: T. Lee/HQ, **Project Manager:** Robert Ferraro/JPL



Initial obs4MIPs data effort led by JPL

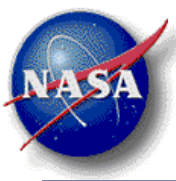


How to bring as much observational scrutiny as possible to the IPCC process?



How to best utilize the wealth of Earth observations for the IPCC process?

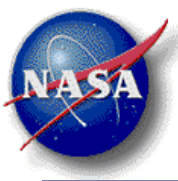
AR5 – initial target
AR6 and other MIPs – long-term targets



Observation data holdings on the JPL and GSFC portals



- [AIRS Air Temperature](#)
- [AIRS Specific Humidity](#)
- [AMSR-E Sea Surface Temperature](#)
- [AVISO Sea Surface Height](#)
- [CERES TOA Outgoing Clear-Sky Longwave Radiation](#)
- [CERES TOA Outgoing Longwave Radiation](#)
- [CERES TOA Incident Shortwave Radiation](#)
- [CERES TOA Outgoing Clear-Sky Shortwave Radiation](#)
- [CERES TOA Outgoing Shortwave Radiation](#)
- [MLS Specific Humidity](#)
- [MLS Air Temperature](#)
- [MODIS Cloud Fraction](#)
- [TES Ozone](#)
- [TRMM Precipitation 3-Hourly](#)
- [TRMM Precipitation Monthly](#)
- [QuikSCAT Wind Speed](#)
- [QuikSCAT Eastward Near-Surface Wind](#)
- [QuikSCAT Northward Near-Surface Wind](#)
- GPCP Precipitation Monthly
- GPCP Precipitation Daily
- CALIOP Cloud
- CERES-EBAF Surface
- MISR Aerosol Optical Thickness
- PARASOL Reflectance



ESGF interface





ESGF Portal

esgf.nccs.nasa.gov/esgf-web-fe/live;jsessionid=BD921440998A3091BC

ceres subsetter

Feedback

ESGF
Earth System Grid Federation



Home Search Tools Login Help

Current Selections

[remove all](#)
[\(x\) project:obs4MIPs](#)
[\(x\) source id:CERES-EBAF Surface](#)

Search Categories

Project

Institute

Model

Instrument

Experiment Family

Time Frequency

Product

Realm

Variable

Variable Long Name

CMIP Table

CF Standard Name

Search

Examples: *temperature*, *"surface temperature"*, *climate AND project:CMIP5 AND variable:hus*.
To download data: add datasets to your Data Cart, then click on *Expand* or *wget*.

☒ Search All Sites ☐ Show All Replicas ☐ Show All Versions

< 1 > displaying 1 to 1 of 1 search results

Display datasets per page

[Add All Displayed to Datacart](#) [Remove All Displayed from Datacart](#)

Results Data Cart

☐ Show all ☒ Filter over search constraints

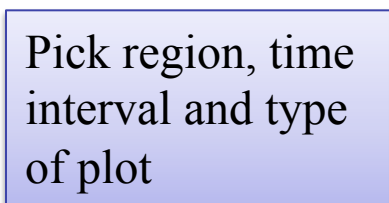
[Globus Online All Selected](#) [WGET All Selected](#) [Remove All](#)

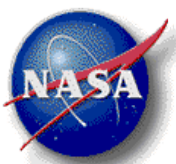
☒

obs4MIPs.NASA-LaRC.CERES-EBAF_Surface.atmos.mon.v20121112|esgdata1.nccs.nasa.gov

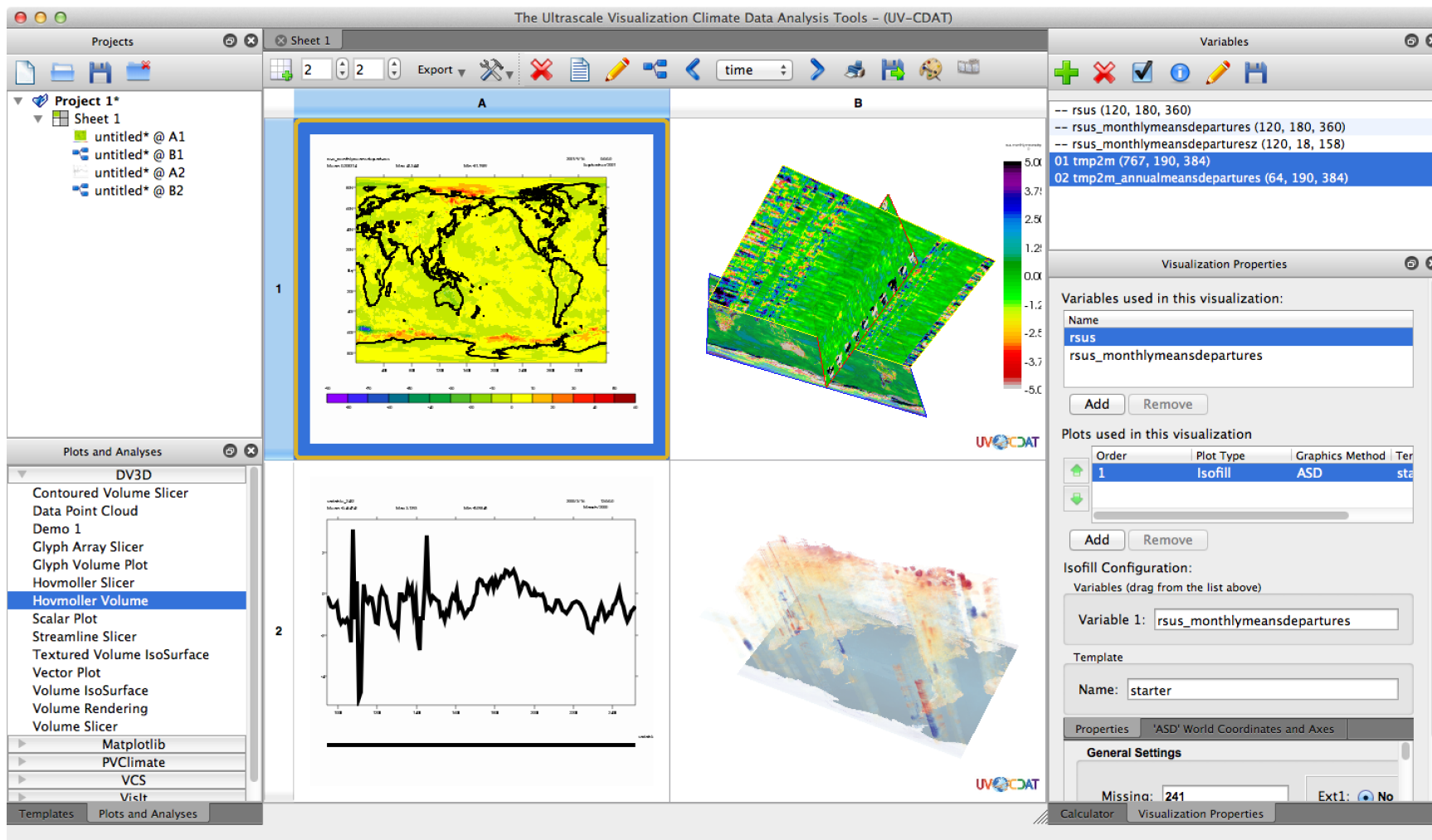
(Total Number of Files: 7)

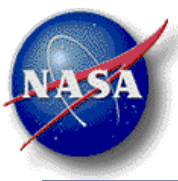
[Expand](#) | [WGET](#) | [Remove](#)



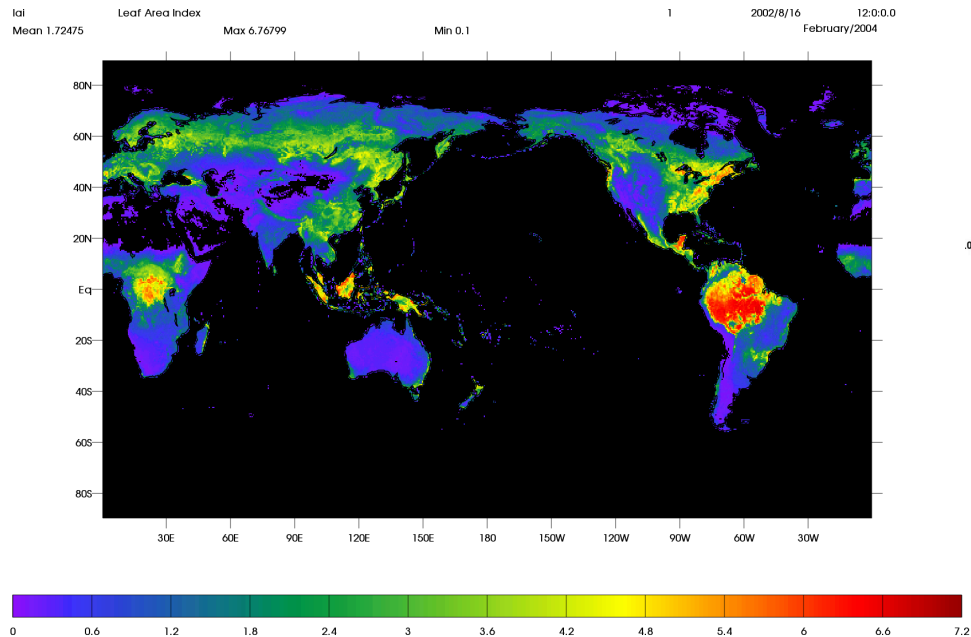


Ultra-scale climate data analysis tool (UV-CDAT) is customized to work with data from ESGF (demo later)

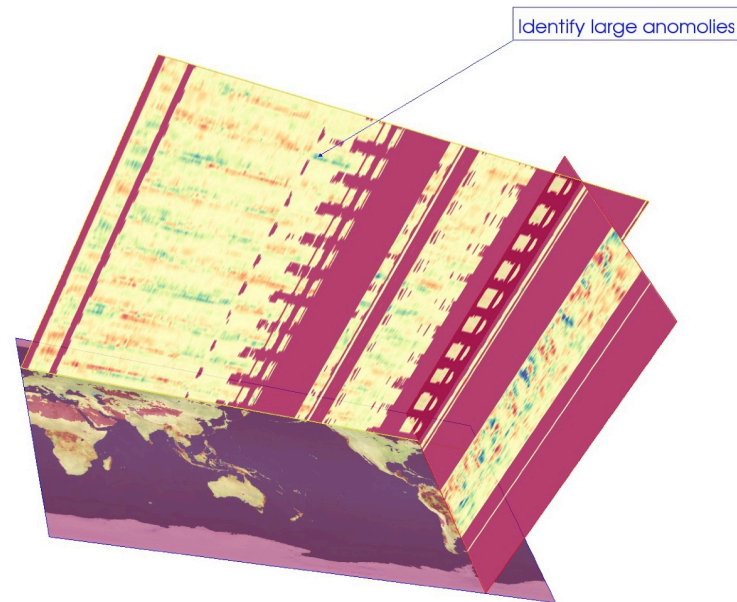


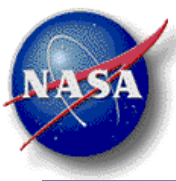


An example of newly added variables - Leaf Area Index



0). Value: 0.646 .

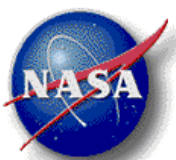




ana4MIPs is a new project



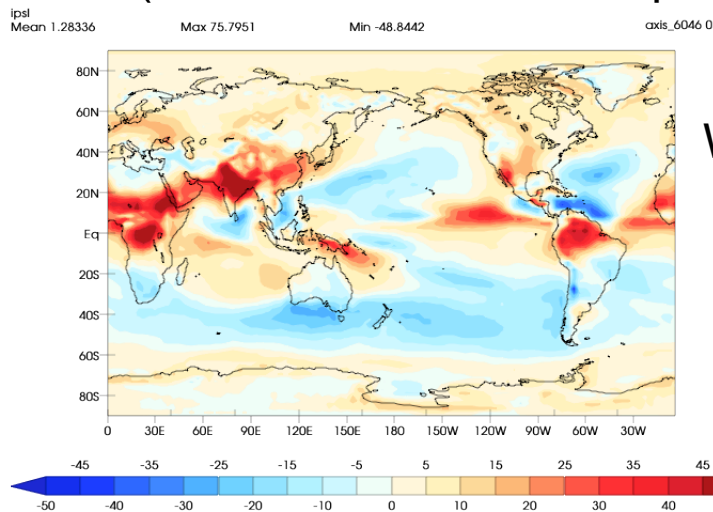
- Analysis products reformatted to conform with CMIP5 and obs4MIPs
 - Will contain all of the major monthly averaged reanalysis products available today
 - MERRA ✓
 - CFSR ✓
 - ECMWF-Interim ✓
 - JRA-25
 - 20CR



Compared to CERES EBAF OLR

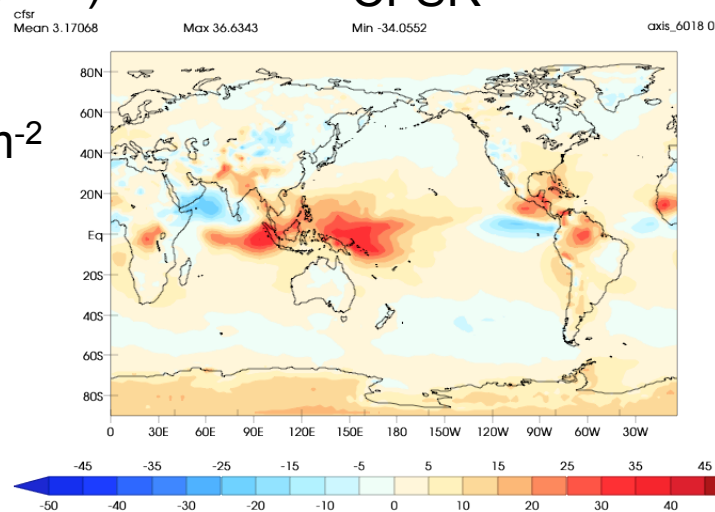


a) IPSL (Institut Pierre Simon Laplace)

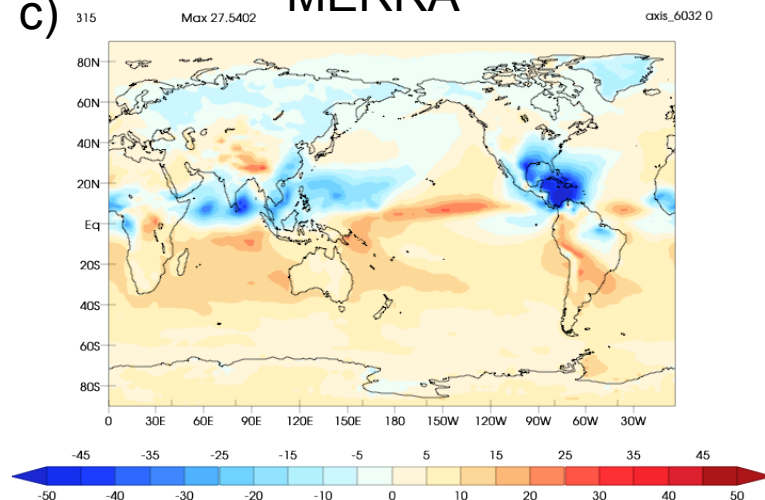


Wm⁻²

b) CFSR



c) MERRA



Suggests that difference among reanalyses could be significant for some variables

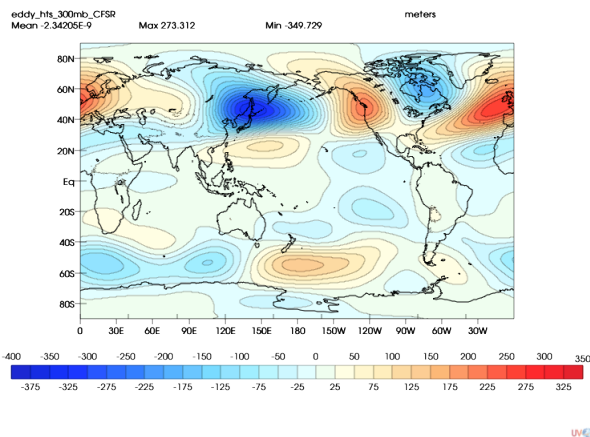
- Data selected from ESGF: CMIP5, obs4MIPs, and ana4MIPs
- Regrided, minus JJA CERES EBAF and plotted by UVCDAT



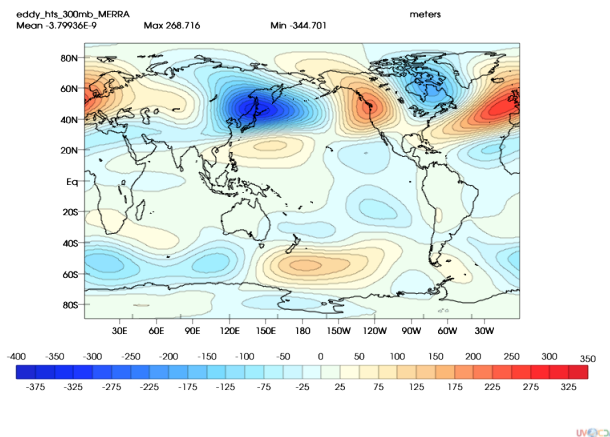
Compare January Eddy Heights at 300 hPa



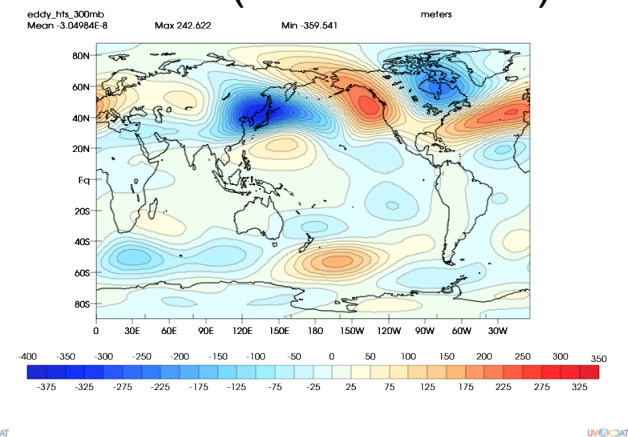
CFSR



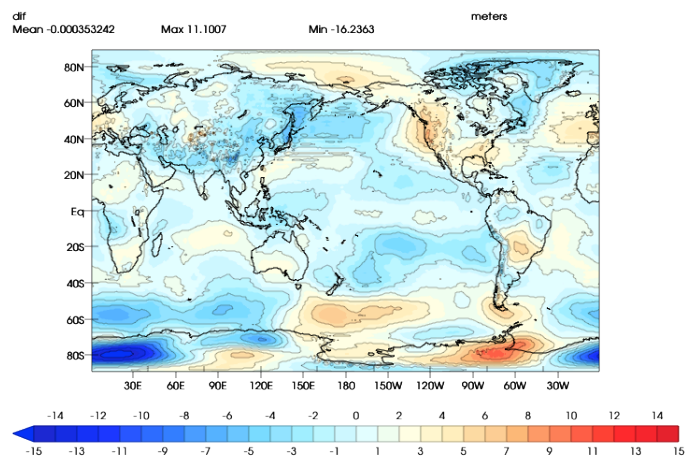
MERRA



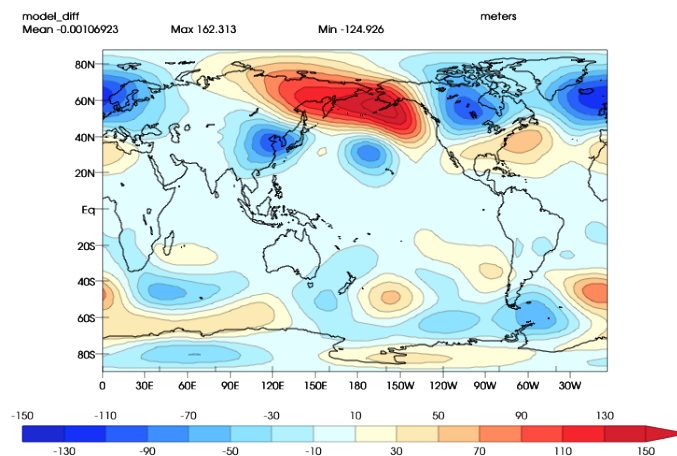
IPSL (CMIP5 model)



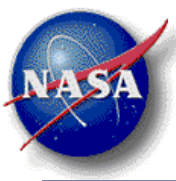
MERRA-CFSR



MERRA-IPSL



Note scale difference



Demo of UV-CDAT using CERES EBAF data



- Free tool to visualize gridded data sets
- Connected to ESGF (optional)
- 2D and 3D visualization

UV-CDATFileEditViewVisTrailsPCMDITools

The Ultrascalse Visualization Climate Data Analysis Tools - (UV-CDAT)

Sheet 11Export

Project 1*Sheet 1

A

Drag and drop a variable here

Plots and Analyses

1

DV3D
Matplotlib
PVClimate
VCS
Visit

TemplatesPlots and Analyses

Add variable(s).

Variables

Calculator

varnum = 2 -----
Loaded Volume Render With Slicer version: 612
----- Loaded plot Glyph Volume, varnum = 2

Loaded Glyph Volume version: 25
----- Loaded plot Streamline Slicer, varnum = 2

Loaded Streamline Slicer version: 114
----- Loaded plot IsoSurface With Texture, varnum
= 2 -----
Loaded IsoSurface With Texture version: 16
----- Loaded plot Volume Render, varnum = 1

Loaded Volume Render version: 413
----- Loaded plot Glyph Slicer, varnum = 2 -----
Loaded Glyph Slicer version: 190
----- Loaded plot Hovmoller Volume, varnum = 1

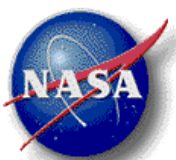
Loaded Hovmoller Volume version: 287
----- Loaded plot IsoSurface, varnum = 1 -----
Loaded IsoSurface version: 11
----- Loaded plot Curtain Plot, varnum = 1 -----
Loaded Curtain Plot version: 10
----- Loaded plot PV Contour Representation,
varnum = 1 -----
Loaded PV Contour Representation version: 15
----- Loaded plot PV Slice Representation, varnum =
1 -----
Loaded PV Slice Representation version: 20
----- Loaded plot Contour Plot, varnum = 1 -----
----- Loaded plot Pseudocolor Plot, varnum = 1

----- Loaded plot Histogram, varnum = 1 -----
Loaded Histogram version: 28
None None

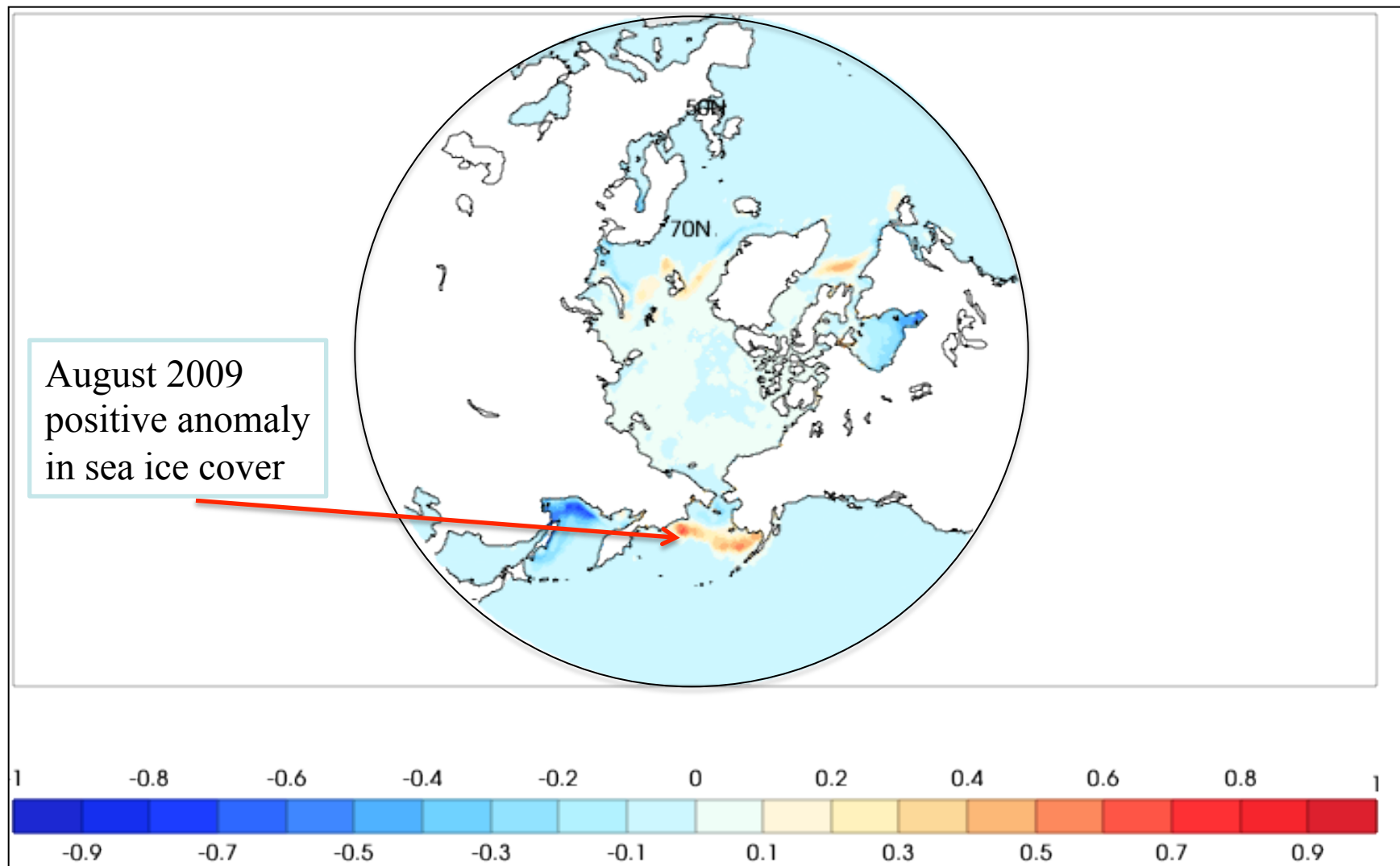
Enter CDAT command and press Return

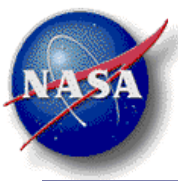
x^2	sqRT	1/x	x^y
LN	LOG	e^x	10^x
x<y	x>y	x<>y	x==y
SIN	ARCSIN	COS	ARCCOS
TAN	ARCTAN	STD	ABS
REGRID	MASK	GET_MASK	GROWER
Clear	7	8	9
Del	4	5	6
Enter	1	2	3
Plot	0	.	+/-





CFSR Sea ice reanalysis





Summary obs4MIPs and ana4MIPs



- One-stop shopping for climate models, observations, and reanalyses
- Tools for analysis in development
- Conforms to CF standards and beyond
- Standardized interface to data (ESGF)
- Documented